REMARKS/ARGUMENTS

Claims 1-15 are now active in this application.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 102 AND § 103

Claims 1-3, 5-10 and 12-14 are rejected under 35 U.S.C. § 102(e) as being anticipated by Smith.

The rejections are respectfully traversed.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the identical disclosure in a single reference of each element of a claimed invention such that the identically claimed invention is placed into possession of one having ordinary skill in the art. ***Helifix Ltd. v. Blok-Lok, Ltd.***, 208 F.3d 1339, 200 U.S. App. LEXIS 6300, 54 USPQ2d 1299 (Fed. Cir. 2000); ***Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.,*** 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994).

As noted in the previous Response, Smith discloses an apparatus which comprises a container 12 holding liquid resin 10, an energy source 8, a spatial light modulator (DMD) 4 and a computer control system 2 (column 6, lines 11 to 19). In the apparatus, the surface of the liquid resin 10 cures into a solid lamina with irradiation of light from the spatial light modulator 4 which is controlled by the computer control system 2 (column 6, lines 52 to 55 and column 7, lines 1 to 10). The elevator platform 16 in the container 12 is moved down from the surface and new liquid resin 10 is allowed to flow over the cured lamina so that a portion of this new liquid is, in turn, converted to a solid lamina by the spatial light modulator (column 7, lines 10 to 17). This process is continued until the entire three-dimensional part 14 is formed (column 7, lines 22 to 23). In this manner, in Smith, the apparatus repeats the irradiation of light from the spatial

light modulator 4 and movement of the cured lamina by the elevator platform 16 to form the model (via ***stacking lamina of resin***). More specifically, in Smith, a 3D physical model is formed **with** ***stacking lamina of resin***. In contrast, in the present invention, a 3D physical model is formed **without** ***stacking lamina of resin***.

In independent claims 1, 5 and 12 of the present invention, a controller of a photo-fabrication apparatus controls a quantity of irradiation light for each of a group of exposure regions (or fixed irradiation regions) on photosensitive material among more than two levels and ***obtains an exposed depth of the photosensitive material at each of the group of exposure regions in accordance with a cumulative quantity of irradiation light emitted thereto***.

As described in the previous response, a structure (controller) to control the quantity of irradiation light for each exposure region (or fixed irradiation region) among more than two levels is not disclosed or suggested in Smith. In addition, the computer control system 2 in Smith ***cannot obtain a relation between a quantity of irradiation light for one exposure region on a photosensitive material and an exposed depth of the photosensitive material***. Thus, independent claims 1, 5 and 12 of the present invention are far different from Smith 378 (and Hagenau 179) in the point where a 3D physical model is formed **without** stacking lamina of resin.

In the present Office Action, the Examiner contends that "...the language incorporated into claims 1, 5 and 12, (via the previous amendment) are merely method limitations limiting the intended use of the device being sought for a patent. The limitations do not further structurally limit the apparatuses taught by Smith 378 nor Hagenau 179." In view of such assertion, it is presumed that the Examiner did not consider the language incorporated into claims 1, 5 and 12,

via the previous amendment as further limiting the apparatus recited in independent claims 1, 5 and 12 *vis-à-vis* Smith.

Since it is believed that such language has not been considered by the Examiner, Applicants hereby assert that they disagree with the Examiner rationale for not considering the language incorporated into independent claims 1, 5 and 12 via the previous amendment. The relevant language of independent claim 1 is:

> a controller ***for controlling tilt angles*** of said plurality of micromirrors ***to control*** a quantity of irradiation light for each of a group of irradiation regions on said photosensitive material among more than two levels ***and obtain an exposed depth of said photosensitive material at said each of said group of irradiation regions in accordance with a cumulative quantity of irradiation light emitted thereto***, said group of irradiation regions corresponding to said plurality of micromirrors and being fixed onto said photosensitive material. (Emphasis added)

The relevant language of independent claim 5 is:

> a controller ***for controlling said spatial light modulator*** in synchronization with a relative movement of said group of irradiation regions ***to control*** a cumulative quantity of irradiation light emitted to each of exposure regions defined on said photosensitive material among more than two levels while a plurality of irradiation regions pass said each of exposure regions, ***to obtain an exposed depth of said photosensitive material at said each of exposure regions in accordance with said cumulative quantity of irradiation light***. (Emphasis added)

Finally, the relevant language of independent claim 12 is:

> a controller ***for controlling said light source unit*** in synchronization with a relative movement of said irradiation region ***to control*** a cumulative quantity of irradiation light for each of exposure regions defined on said photosensitive material among more than two levels ***and obtain an exposed depth of said photosensitive material at said each of exposure regions in accordance with said cumulative quantity of irradiation light***. (Emphasis added)

The correct description of the above noted language regarding "a controller" is that it is "functional"; i.e., it defines the controller by what it does. In claim 1, the controller controls the ***tilt angles*** (of said plurality of micromirrors) ***to control*** a quantity of irradiation light for each of a group of irradiation regions on said photosensitive material among more than two levels ***and obtain an exposed depth of said photosensitive material at said each of said group of irradiation regions in accordance with a cumulative quantity of irradiation light emitted thereto***.

In claim 5, the controller controls the ***spatial light modulator*** (in synchronization with a relative movement of said group of irradiation regions) ***to control*** a cumulative quantity of irradiation light emitted to each of exposure regions defined on said photosensitive material among more than two levels while a plurality of irradiation regions pass said each of exposure regions, ***to obtain an exposed depth of said photosensitive material at said each of exposure regions in accordance with said cumulative quantity of irradiation light***

In claim 12, the controller controls the ***light source unit*** (in synchronization with a relative movement of said irradiation region) ***to control*** a cumulative quantity of irradiation light for each of exposure regions defined on said photosensitive material among more than two levels ***and obtain an exposed depth of said photosensitive material at said each of exposure regions in accordance with said cumulative quantity of irradiation light***.

Such functional language properly and specifically limits the scope of the recited controller and must be considered when determining the scope of the claim(s) *vis-à-vis* Smith. More specifically, the above noted functions of the controller recited in independent claims 1, 5 and 12, which must be considered in determining patentability of these claims, are not disclosed or suggested in Smith.

Attention is directed to M.P.E.P. § **2173.05(g) Functional Limitations** which sets forth the requirement to evaluate functional limitations recited in a claim.

> A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. ***In re Swinehart***, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).
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> A functional limitation ***must be evaluated and considered***, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step.

Regarding the Examiner's reference to "intended use", it should understood that ***there is nothing inherently wrong in reciting an intended use of a specific element in an apparatus***. The prohibition of giving patentable weight with respect to "intended use" occurs ***when intended use of a process or a structure is recited in the preamble*** and the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951); (see M.P.E.P. § 707.07(f) Answer All Material Traversed). However, the functional limitations of independent claims 1, 5, and 12 describe what a specific (recited) element (controller) does.

Since the above noted functions of the controller recited in independent claims 1, 5 and 12 are not disclosed in Smith, independent claims 1, 5 and 12 are patentable over Smith, Furthermore, since claims 2, 3, 6-10, 13 and 14 depend directly or indirectly from independent claims 1, 5 or 12, claims 2, 3, 6-10, 13 and 14 are patentable over Smith also. Consequently, the allowance of claims 1-3, 5-10 and 12-14 is respectfully solicited.

II. Claims 4, 11 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith in view of Hagenau (USPN 6,051,179).

However, as claims 4, 11 and 15 depend directly or indirectly from independent claims 1, 5 or 12, claims 4, 11 and 15 are patentable over Smith also, even when considered in view of Hagenau. Consequently, the allowance of claims 4, 11 and 15 is respectfully solicited also.

CONCLUSION

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

Accordingly, it is urged that the application, as now amended, overcomes the rejection of record and is in condition for allowance. Entry of the amendment and favorable reconsideration of this application, as amended, are respectfully requested. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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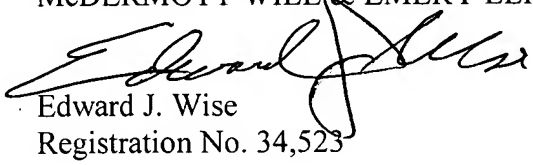

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